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ABSTRACT

This paper considers the problem of differentiating thought and language in a way that makes it possible to relate them to each other. The analysis covers approaches of sociolinguistic research, different models of language and cognitive functioning within psychology and linguistics, the cybernetic approach, and psycholinguistic analyses. A common approach has been to consider similarities and differences between languages and between cultures in thinking and linguistic forms. More recently, this approach has been extended to include comparisons between subcultures, social classes, and dialects. Another approach has more directly focused on the relation between units of thought and linguistic units. Problems associated with comparisons between languages and cultures and with focusing on linguistic form are discussed. To illustrate the problem of differentiating thought and language, a few examples involving written answers to questions about the meaning of a text are presented. It is concluded that to obtain an understanding of the relation between language and thought, one should study the successive change of conceptions and the use of linguistic forms and the interplay between such changes. Descriptions of the relation between thought and language should be made within a learning or development perspective. A Swedish translation of a portion of the text is appended. (SW)

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Questions concerning the relation between thought and language are old ones in the history of man's reflection upon his own activity. Such questions have to a great extent centred on the character of and relation between concepts and propositions on the one hand and words and sentences on the other. A few general questions have been rather dominating. Is there a necessary determined relation between thought and language or is the relation a matter of convention? Which is (are) the direction(s) of the interdependence between language and thought? Are there universals of thought and language? Is there a relativity of thought, so that one's language determines one's view of the world?

These and similar questions have been discussed for a long time and extreme positions have been taken. The arguments seem to have been based on mainly two types of observations. One type of observation has concerned similarities and differences between languages and between cultures in thinking and linguistic forms. Comparisons between cultures and languages can perhaps be said to have been extended to comparisons between subcultures, social classes and dialects more recently. The other type of observation has more directly focused on the relation between units of thought and linguistic units. A great part of the argumentation about this relation seems to be implicit in the presentations of models of thinking and models of language and language use.

The comparisons between languages and cultures of course have been based on descriptions of each language and the thinking within each culture. However, those descriptions have not directly concerned the relation between thought and language in each case. In some cases the language has been in focus, in other cases the thinking or both thinking and language in combination. Thus the comparisons have not been based on or concerned descriptions of the relation between language and thought in different cases. However, similarities and differences between languages, between the thinking in different cultures or the joint appearance of both thinking and language have been the basis for arguments concerning the relation between thought and language. Mostly, this argumentation has been for or against linguistic relativism and/or universalism.

Nor does the sociolinguistic research, which is of more recent date, focus on the relation between thought and language. It gives general descriptions of differences in language use between social groups and to some extent between different situations for the same group. The concept of linguistic code presented by Bernstein (1971) seems hard to delimit in a way clearly distinguishing social groups. The next step could be to extend the analyses to comparisons between individuals rather than groups. Some studies (e.g. Labov 1972) have described differences in language use due to the communication situation. Such interindividual and intraindividual differences in language use give new actuality to the question of if these differences are also differences in linguistic codes as representing differences in "attitude or orientation" i.e. thinking, in a very broad sense. At the same time as the sociolinguistic studies present a new basis for argumentation concerning the possible relation between thought and language, they do not give any direct descriptions of such relations.

Questions concerning the relation between units of thought and linguistic units seems to have its closest counterpart within psychology and linguistics in different models of language and cognitive functioning. However, the assumptions about the relation between language and thought are more or less implicit in the models. Of special interest in this respect is how the problem of meaning is treated. In an earlier work the present author gave a review of some models of meaning (Svensson 1973). In that context, a preference was expressed for the TOTE-model (Miller, Galanter and Pribram 1960) in combination with Rommetveit's (1968, 1972, 1974) emphasis on the context-dependency of language use and on cognitive functioning, information and "message-structure" as opposed to the stress on language per se and grammar within the tradition of generative transformational grammar.

The TOTE-model, according to the authors, was developed to cope with the apparent vacuum between cognition and action in psychological research and theory. The model involves dividing the mental functions into two parts; "plan" and "image". The authors made the following distinction:

A plan is any hierarchical process in the organism that can control the order in which a sequence of operations is to be performed. (p 16)

The image is all the accumulated, organized knowledge that the organism has about itself and the world.
(Miller et al, 1960, p 17)

The cybernetic approach was employed to describe the interaction between these parts. The authors applied the model to the function of language (mainly speech) and pointed to Chomsky's (1957) generative grammar presented in "Syntactic Structures", as a highly developed description of a "plan". Chomsky's grammar was seen as a "grammar plan" which steers verbal behaviour through a "motor plan". The semantic aspects were viewed mainly as a "question plan" checking "image" and were not dealt with further.

There is especially one aspect of the TOTE-model which the later development within the field seems to have come more and more close to. It is the role given to knowledge as the background to language use. This view has been combined with an increasing emphasis on communication, context and pragmatics as important in the understanding of language.

Different models of language and language use present different perspectives on and different assumptions about relation between thought and language. However, they do not represent theories about how variations in thinking relates to variation in linguistic form. This is a type of knowledge of most immediate practical interest which could also be the basis for modifications of the general assumptions about the relation between thought and language.

The psycholinguistic field has been dominated by studies concerned with the relation between thought and language in an atomistic and normative way. The analyses have dealt with ways in which content (thought) in terms of a concept or proposition can be correctly expressed linguistically or how a linguistic form may be correctly interpreted as to content. Although thought and language are thought of as different in nature or form, these analyses imply a stress on the unity of thought and language. Of course, one must be aware of the unity of thought and language, but at the same time the two concepts imply a differentiation within this unity

which the research does not seem to have illuminated. The lack of differentiation of the two concepts in the analyses seems partly to depend on the atomistic character of the analyses.

The problem of differentiating thought and language in a way that makes it possible to relate them to each other thus seems to demand a description of thought which is less dependent on linguistic form. One must analyse thinking not as the meaning of separate words or sentences or as the "sum" of such linguistic units, but as thinking about phenomena, where the phenomena are the units from which one may delimit and describe thinking. For some years, a group of researchers, including the author, has been making such analyses of conceptions of the intentional meaning of texts and conceptions of everyday phenomena (Marton 1975, Dahlgren 1975, Säljö 1975 and Svensson 1976).

To illustrate the problem of differentiating thought and language a few examples will be presented. The examples are written answers to questions about the meaning of a text that the subjects giving the answers had been reading. The answers are taken from an investigation made by Wenestam (1978), a member of the same research group as the present author. The investigation concerned retention of several texts. No analysis of the use of linguistic forms was made. Written answers to questions about the content of the texts were used as indications of the conception of the topics of the texts. The answers used here concern one of the texts and the present author participated in the study as a second judge of the answers concerning this text.

The differences between conceptions are not very clear in this case. We have described other more apparent differences in conceptions in relation to other materials. The main reasons for using the present examples is that the answers are short and given in written form (while most of our research is based on fairly extensive interviews). The above mentioned characteristics of the answers make

it possible to present in a few cases the whole linguistic basis for the judgement of conceptions. At the same time, this means that there is a restricted basis for such judgements. The characteristics of the examples mentioned make them a good illustration of the problems discussed.

Before any presentation of answers is given, the text that the subjects read and the questions posed have to be considered. The text was taken from a book written by Hill (1963)¹. The part of the book used had the title "Abstraction"². An introductory section written by the experimenter was added and the title was omitted. The text comprised 1128 words. The introductory section was a short summary also reflecting the disposition of the text. The section was as follows³:

The text concern the fact that every statement about reality is an abstraction. This means that the statement only includes certain aspects of the total reality. What will be included depends on our interests and the aim of the statement, among other things. In this way we simplify reality so it becomes comprehensible and possible to communicate. The more we simplify, the more general the statement becomes. By making the abstract statement more general it will be more widely applicable and not only in some special case at a certain point in time. This is especially true about scientific laws which have general laws and which apply independent of the specific case(s).

¹Hill, W.F. Learning: Survey of psychological interpretations. London: Methuen and Co Ltd, 1963, p 19-21. (A version in Swedish was used, Hill, W.F. Inläring - undervisning. Stockholm: Aldus/Bonniers, 1970, p 29-31.)

²The text (in English) and the Swedish translation of the text used in the experiment, are given in Appendices 1 and 2.

³This section is given in Swedish in Appendix 3.

There are three parts and themes in the section which recur in the same order in the rest of the text. The three interrelated themes are

1. All statements about reality are abstractions which means that they only give certain aspects of the total reality.
2. What is abstracted depends on the individual's interests and purpose behind the statement. This is how we in fact simplify reality so that we can communicate.
3. The more we simplify the more general the statement will be and it will concern not just a specific situation but many situations. This is especially true in the case of scientific laws.

In the second section, words are described as abstractions. The words "car" and "discrimination" are used as examples. In the third section, two sentences are presented as examples of abstraction (one about Columbus and one about John Doe who dropped his book...). These two sections make up the first theme. The fourth section is a summary of this theme and, at the same time, a transition to the second theme and a new example. This example concerns the probable differences between three persons reporting on the same football game; a society editor, a foreigner and the father of one of the players.

The football game example is discussed in the next section and the impossibility of giving a total and true description of the "real game" is stressed. Also, the lack of interest in a very detailed description and the usefulness of abstraction, organization and simplification is pointed out. In the last section, it is said that the process of abstraction is carried even further in scientific laws than in many other kinds of statements and some examples of such abstractions are presented. This represents the third theme mentioned above.

The subjects participating in the study (64 adults) read the text and then gave written answers to two questions. The two questions were:

1. Please, write down what you remember of the text. Include what seems self-evident and do not understate anything. Write in detail.
2. Try to summarize the text in a few sentences. What is the author trying to say, in other words?

Wenestam (1977) grouped the answers to the questions (considered together) in three groups. One group comprised those few answers that did not contain the main point of the text (all statements are abstractions) but some other way of interpreting and relating the parts of the message (such as that it concerned how we use abstract words or how one cannot be objective in talking about something).

The answers placed in the two other categories all expressed the main point of the message, i.e. that statements and descriptions are abstractions. However, there was an important difference in the conception of the phenomenon of abstraction.

One conception implied that abstraction is the result of an active sorting out of certain information. Interest and purpose was considered important in this activity. We have labelled this variant A. The other conception implied that there is a given set of details and that all these can not be considered with the result that some are omitted. This more passive and quantitative variant has been labelled B. The following discussion will be confined to these two conceptions of abstraction.

It was found that the general differences between the conceptions described above constituted the most interesting differences in thinking about the content of the text. Starting from this description of thought one may then ask what differences exist in the language used to express the conceptions; i.e. the differences in the language that are related to the differences in conception. As was pointed out earlier we have not made such an analysis of the language used. Rather we merely wish to discuss the problem.

Two things should be mentioned before presenting some examples of answers to the two questions posed. First, that in expressing their conception of the whole message the subjects may have relied on

different parts of the text and that this would be related to differences in language use. Second, there might also be a variation in how close to the text they formulated their conception. These aspects will not be discussed separately and only general comments will be given.

The first answer presented below, was interpreted as revealing a conception of type A. It is chosen because it is rather short and the language is close to that of the text⁴.

Subject 1

Question 1

The text said that all statements about reality are abstractions as something is always left out. This is especially so with scientific laws. One example was if the word car is mentioned, which doesn't say anything about the colour, model, year and so on. But rather refers to a car in general. There is also a lot of personal valuation applied to all statements, which was shown by the example of a football game. If it is father of one of the players who reports, the report will probably be mostly about his son. If it is a foreigner, who is here to study our usages and customs, it will be about cheers and, if it is a society editor, about the player's clothes and family background. Even if one puts together reports from all the spectators of the match there would still be details missing about the match. When scientists describe how they have made the mice turn right in a T, they leave out details so that even here statements become abstract.

Question 2

All statements about reality are abstract as we do not describe exact details, but what is of personal interest to the sender and receiver. Both sender and receiver apply valuations based on emotions, desires and will. Thus, according to the author of the text, it is impossible to describe reality exactly.

Most indicative of the fact that this represents an A-conception rather than a B-conception is the statement that "we do not describe exact details, but what is of personal interest to the sender and the receiver" in combination with the absence of general statements stressing the omission of details in a passive way. It is interesting that this part of the answers has a rather different linguistic form compared to the text. The terms sender and receiver are introduced by the subject but the communication perspective is present

⁴The subjects' answers in Swedish are given in Appendix 3.

in the text. The word valuation and the formulations in which it is used are also introduced by the subject. Several of the most significant words in the text such as statement, reality, abstraction and scientific law are used. The disposition of the answer to the first question is close to the text. First a general summary then the word examples, thereafter the relevance of interests and the football game example and, lastly, abstractions in scientific work.

The next example is one where the language used is rather different compared to the first one. The conception has been judged as an A-conception.

Subject 2

Question 1

The text dealt with the accounts of the same occurrence by different persons. Each person gave an account that was based on his own experiences, impressions, choice of word and language, everything that happens within a certain period of time can not be written down in words without it being a simplified version, however, detailed it is.

Man simplifies everything to be able to communicate more easily with each other. Uses general words even if he is talking about, for instance, a specific car he just says car.

When a scientist is looking for the relation between the time a pendulum takes to complete one arc with its length he does not care about what material the pendulum is made of, if it is new or old and so on. The only thing he is interested in is the length and the time it takes to complete one arc.

Question 2

He wanted to say that words and sentences are not sufficient to cover everything that is happening, however detailed one is writing or telling. That man simplifies and summarizes situations according to his own personality and his own tastes and interests.

There is a repeated theme in the answer indicative of an A-conception. It says that people have to simplify and that they do so as a result of experience and interests. Several words that are central in the text (abstraction, statement, reality) are not used. The disposition of the answer is quite different from that of the text. The importance of experience and personality is added. The subject talks about accounts, words and sentences. The word simplification, also used in the text, is the central word replacing abstraction. These differences in relation to the text are also differences in

relation to the first subject's answer. These two subjects are thus judged to have, in an abstract sense, similar conceptions of the phenomenon of abstraction but they used very different linguistic forms to express this conception.

The next answer was categorized as a B-answer.

Subject 3

Question 1

It is about statements that are abstract. However one describes an object one can not include all the details. If one describes the word car one is not thinking of details like model, colour and for instance condition.

If someone is going to report on a football game for instance, the report will be totally different depending on who has made it. If it is a father of one of the player or for instance a foreigner. Even if a reporter collects all the information about what every spectator has seen, heard and experienced and takes several years to make a report about the match, there will always be details left out.

Question 2

However carefully one describes an object or a situation there will always be details left out.

This is an answer which is more similar to the first than to the second answer presented above. However, it does not contain any general statement that suggests the importance of the individual as an agent. (To some extent such a meaning is implicit in the retelling of the football game example.) What is stressed is that, in the process of abstraction, some details are always lost. This is why it is judged a B-answer. This emphasis on lost details constitutes a difference in relation to the text and the two answers given earlier both concerning conception and language. At the same time formulations of the kind given by this third subject are present in the text but together with other formulations which makes the message as a whole different. The formulations used are rather similar to formulations in the text. The words statement and abstraction are used in the answer.

One more example of a B-conception will be presented. It is more different compared with the text than the B-answer above.

Subject 4

Question 1

The text begins with a presentation of the concept of abstraction i.e. our ability to forget and leave out details when we are writing. No one can avoid abstraction. Furthermore, a football game was dealt with, seen from the points of view of different persons, where everyone described the match according to how he saw it. Also everyone stressed different things according to his point of view. Even if one asked everyone present and collected their views, one would still not get all the details because it is impossible. In scientific research, it is not the details that are important but the whole situation - the conclusion. The details in, for instance, an experiment (in the text was mentioned the form and material of the pendulum, which can be disregarded when describing the motion of the pendulum) are not important because they do not concern the whole situation and the conclusion.

Question 2

Abstraction is impossible to avoid and everybody suffers from it. In scientific research, abstraction does not mean that much because then one looks for the greater whole and not for the details.

Here, the view of abstraction as a passive process is very clearly stated. Abstraction is said to be the same as forgetting details something that happens to all of us. At the same time the answer to the first question follows the disposition of the text.

From these examples it can be seen that there are certain formulations that are interpreted as expressing conception A rather than conception B, and that these formulations are absent in the answers judged as B-answers. This seem to be the most important difference between A- and B-answers. However, there also tend to be formulations in the B-answers which are not present in the A-answers (but not necessarily). At the same time as this is true there are great differences between subjects in the formulations used to express the same A- or B-conception. This means that there may be more similar formulations between subjects with different conceptions than between subjects with the same conception.

To clarify the relation between thought and language must be the same as describing similarities and differences of the kind exemplified above. This could also mean a development or change of the

description of conceptions occurring at the same time as the similarities and differences in language use were described. Apparently there is a close relation between thought and language, but it seems important, starting from this relation, to describe the content of both thought and language as representing what is related.

The thought expressed in linguistic form is subjective and need not correspond to the meaning of the linguistic form according to common linguistic rules. Even if there is such a correspondence in most cases, i.e. the person uses language according to common rules, this common meaning does not represent the subjective thought, other than in a restricted way. If one wants to describe what a person really means, it is usually not enough to give the common meaning of one utterance. We have to penetrate what he thinks about the phenomenon which he made the topic of the utterance, i.e. his conception of it. To analyse the thought expressed we can use language (predominantly parts of the language which are more common) to explore the conception behind the utterance (which is partly the same as exploring the intentional depth of the utterance). Through a broadening of the analysis to relations between different utterances (and to thoughts first assumed rather than expressed) one obtains descriptions of thought that are based on language use but which concern conceptions of phenomena not the meaning of linguistic units.

Similar conceptions of the same phenomenon are related to wide variations in linguistic forms. At the same time, differences in conception may be combined with great similarities in linguistic form. Starting from descriptions of conceptions, one is able to relate the variation in conceptions to descriptions of the linguistic forms used to find out whether any systematic relations between differences in conception and use of linguistic form can be found.

Thus, one could describe thought in terms of conceptions and the relation between conceptions and use of linguistic forms. However, so far we would obtain rather static descriptions of combinations of thought and language. To develop a deeper understanding of the interdependence and interplay between language and thought, such descriptions have to be made within a learning or development per-

spective. Through studies of the successive change of conceptions and use of linguistic forms and of interplay between such changes one would be able to obtain a good basis for understanding the relation between thought and language.

To sum up, what is suggested is

1. A differentiation of the descriptions of thought and language by means of a description of the thought content in terms of different conceptions of the same phenomenon.
2. Relating descriptions of conceptions of the same phenomenon to the use of linguistic forms in describing this phenomenon.
3. Relating such combinations of thought and language use on different occasions to each other to describe change as a result of learning and development.

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The text (Hill, W.F. Learning: Survey of psychological interpretations. London: Methuen and Co Ltd, 1963, p 19-21).

Abstraction

Scientific laws are statements about the way the world operates, and like all statements they involve abstractions. Whenever we apply words to things and events, we ignore a great deal of what is there in order to focus attention on what this particular thing or event has in common with others. For example, when we call something a car, we are ignoring its make, model, year and color in order to emphasize the features it has in common with other cars. In other words, we are abstracting its "car-ness" from all the other characteristics of this particular battered, brown, eight-year-old, two-door Ford. The same is true when we use the term "discrimination" to describe the behavior both of a rat learning whether to turn right or left in a T maze and of a child learning whether to use "ar" or "er" in spelling a word. Again, we are dealing with an abstract concept, ignoring most aspects of the two situations in order to concentrate on one thing that they have in common.

Since some degree of abstraction is inescapable, any statement, however concretely "factual", is an abstract formulation that tells only a part of the truth. To say, "Columbus crossed the ocean blue in 1492", is to give only the barest outline of that momentous event. Even to say "John Doe dropped a copy of a 'A Tale of Two Cities' from his school desk to the floor in the middle of an arithmetic lesson in Room 6 on the morning of March 17" is to give only a minute fraction of the detail that could have been observed. For all their tremendous value, words are only pale shadows of the things they represent.

This process of abstraction goes on in all description and in all thought. Every intellectual activity involves the organization and simplification of "reality" as it is presented to our senses. This statement is true whether we consider simple perceptions or complex thoughts and whether we look at science, art, sports, business or any other area of human interest. Imagine, for example, what the radio broadcast of a football game would sound like if it were presented by a society editor, or by the proud father of one of the players, or by a foreigner studying American customs. The society editor might spend all her time describing the lovely uniforms and discussing the family backgrounds of the players; the proud father might report only what his own son was doing; and the foreigner might be much more interested in the cheers and card stunts than in the progress of the game. Each of these three descriptions could be perfectly true and valid as far as it went, but what football fan would accept any of them as an adequate report of the game? Each description including the professional sportscaster's would deal with only some aspects of the "real game", each would reflect not only what "really happened" but also the interests and biases and vocabulary of the reporter.

In effect there is no such thing as pure reality, there is only reality as described and interpreted and reacted to by someone.

Some descriptions are more accurate or more detailed than others, but no description is complete. Even if someone were ambitious enough to collect descriptions of a football game from everyone who was there, check them with other kinds of evidence, spend years sifting and combining these accounts and give a final report of the game many volumes long, there would still be details that were omitted. The report would still be only an abstract, even though a very detailed one, of what happened at the game. In any case, no one would read the report, since each possible reader would be interested in those aspects of the game that he considered interesting or important, not in the most detailed account that human patience and ingenuity could devise. Hence, any useful report of the game would involve far more abstraction and organization and simplification than our imaginary multivolume monstrosity of a description.

This process of abstraction is carried even farther in scientific laws than in many other kinds of statements. In history, biography and literature, as well as in everyday speech, we are often concerned with describing an event in as much rich detail as time and the limitations of language permit. Our several imaginary broadcasts of the football game, different as they were, were nevertheless all trying for such completeness within the limits of the reports' interests. In science, however, we are always concerned with picking out certain aspects of the situation to be related to other aspects. In relating the period of a pendulum to its length, the physicist need not concern himself with what the pendulum is made of or with whether it is a clock pendulum, a plumb bob, or a museum display. Similarly, the psychologist's statement that removal of the reinforcer reduces the frequency of the response applies whether the reinforcer is food or praise and whether the response is pecking a key or studying spelling. The laws connecting independent and dependent variables are not descriptions of any particular event - they are statements about the conditions under which certain kinds of events occur. Scientific laws are not concerned specifically with the red sky in Chicago on June 10 or with the pendulum of John Jones's grandfather's clock, but with all red skies or all pendulums. Some laws may be quite narrow in the range of phenomena to which they refer but even the narrowest always refers to certain kinds of events, never merely to a single unique event.

Swedish translation of the text (Hill, W.F. Inlärnin - undervisning. Stockholm: Aldus/Bonniers, 1970, p 29-31).

Abstraktioner

De vetenskapliga lagarna är utsagor om hur världen fungerar och som alla utsagor inrymmer de abstraktioner. När vi klistrar fast beteckningar på saker eller händelser bortser vi från en hel del av det som existerar för att kunna inrikta oss på det som denna speciella sak eller händelse har gemensamt med andra. När vi använder ordet bil, bortser vi till exempel från märke, modell, tillverkningsår och färg för att understryka de drag som denna bil har gemensamma med andra bilar. Vi abstraherar med andra ord dess "bilighet" från alla andra egenskaper som utmärker just denna speciella illa hanterade, bruna, åtta år gamla tvådörrars Ford. Samma sak gäller när vi använder termen "diskriminering" för att beskriva beteendet både hos en rätta som lär sig om hon skall ta av åt höger eller åt vänster i en T-labyrint och hos ett barn som lär sig när en konsonant skall vara enkel- eller dubbeltecknad. Också här arbetar vi med ett abstrakt begrepp och bortser från de flesta av egenskaperna hos de båda inlärningsituationerna för att kunna koncentrera oss på just denna sak som är gemensam för dem båda.

Eftersom en viss grad av abstraktion är oundviklig är vartenda konstaterande, hur konkret "faktiskt" det än må vara, dock ändå alltid en abstrakt formulering som bara utsäger en del av sanningen. Att påstå att "Columbus seglade över Atlanten 1492" innebär att man bara ger de allra knapphändigaste konturerna av denna epokgörande händelse. Men till och med ett sådant yttrande som att "John Brown tappade ett exemplar av "Två städer" som åkte ner från bänklöcket och hamnade på golvet mitt under en mattelektion i lärosal 6 på morgonen den 17 mars", ger bara en mycket liten bråkdel av alla de detaljer man kunde ha observerat i sammanhanget. Sitt ofantliga värde till trots är orden dock bara bleka skuggor av de ting som de representerar.

Denna abstraktionsprocess fortgår i all beskrivning och allt tänkande. Varenda intellektuell aktivitet inrymmer ett organiserande och förenklande av "verkligheten" sådan den presenteras för våra sinnen. Detta konstaterande är lika sant vare sig vi tänker på enkla varseblivningar eller komplicerade tankegångar, vare sig det rör sig om vetenskap, konst, idrott, affärer eller någon annan sida av människans verksamhet. Föreställ er till exempel hur radioutsändningen av en fotbollsmatch skulle låta om den sköttes av en societetsreporter, den stolte fadern till en av spelarna eller en utlänning som studerade våra folkseder. Galapettran skulle förmodligen använda hela sändningstiden till att beskriva de vackra dräkterna och skvallra om de olika spelarnas familjeförhållanden, den stolte fadern skulle säkert koncentrera sig en hel del på sonens göranden och låtanden och främlingen skulle kanske vara långt mera intresserad av hurra-ropen och "ut med domarn"-vrålen än av själva matchen och dess förlopp. Alla tre reportagen skulle vara fullständigt riktiga och på sitt sätt sanna, men finns det en enda fotbollsfantast på jorden som skulle acceptera ett sådant reportage från en landsmatch? Vartenda reportage, också sportjournalistens, skulle bara ta upp vissa sidor av "den verkliga matchen" och vart och ett av dem skulle också av-

spegla inte bara vad som "verkligen hände" utan också hallåmannens personliga intressen och fördomar och speciella vokabulär.

I själva verket existerar ingen "ren" verklighet; vad vi har är bara verkligheten sådan den beskrivs och tolkas eller reageras på av någon. Vissa beskrivningar är exaktare och mer detaljerade än andra, men ingen beskrivning är helt fullständig. Till och med om någon var så brinnande ambitiös att han samlade in redogörelser för en fotbollsmatch från varenda närvarande vid arenan, kontrollerade dem mot andra tillgängliga vittnesbörd, tillbringade flera år med att gå igenom och sammanställa dessa redogörelser och slutligen skrev en flera volymer tjock avhandling om matchen, så skulle det ändå existera detaljer som han inte hade fått med. Hans rapport skulle fortfarande bara vara en abstrahering, ett utdrag om ock ett mycket detaljerat sådant, av vad som verkligen hände under den där matchen. Och hur som helst skulle ingen människa läsa alla de där volymerna, eftersom varje tänkbar läsare bara skulle vara intresserad av de sidor av matchen som han själv betraktade som intressanta och betydelsefulla, inte av den mest detaljerade rapport det mänskliga tålamodet och uppfinningsrikedomen alls kan åstadkomma. Vilket alltså innebär att en acceptabel redogörelse för matchen i fråga skulle kräva mycket mera av abstraherande och organiserande av materialet och förenklingar av detta än vad vi finner hos vår tänkta monstruösa flerbandare.

Denna abstraheringsprocess drivs i de vetenskapliga lagarna ännu längre än i de flesta andra typer av utsagor. På det historiska, biografiska eller litterära fältet och också i vårt vardagliga tal försöker vi ofta beskriva en händelse så rikt detaljerat som tiden och språkets begränsningar tillåter. De imaginära fotbollsreportagen härovan strävade trots sina inbördes olikheter dock allesammans efter att ge största möjliga fullständighet inom ramen för rapportörens egna intressen. Inom vetenskapen strävar man emellertid alltid efter att välja ut vissa delar av en situation för att sätta dem i förhållande till andra delar av den. När fysikern söker finna sambandet mellan pendelns svängningstal och dess längd, behöver han inte bekymra sig om vad pendeln är tillverkad av eller om det rör sig om en urpendel, en lodlina eller ett museiföremål. På samma sätt gäller psykologens påstående att ett avlägsnande av förstärkaren sänker frekvensen hos responsen oavsett om förstärkaren utgörs av mat eller beröm och om responsen består i att man pickar på en skiva eller studerar rättstavning. De lagar som förenar oberoende och beroende variabler är inte beskrivningar av någon speciell händelse - de utsäger under vilka betingelser vissa typer av händelser inträffar. Vetenskapliga lagar intresserar sig inte speciellt för om morgonen var mulen över Chicago just den 10 juni eller för lodet i John Jones' moraklocka, utan för alla mulna morgnar och alla pendlar. En del lagar kan visserligen gälla endast för en mycket begränsad grupp av fenomen, men också de allra snävaste bland dem gäller dock alltid för en hel grupp av händelser, inte bara för en enda speciell sådan.

Quotations in Swedish

Introductory section

Texten handlar om att varje utsaga om verkligheten är en abstraktion. Detta innebär att utsagan endast tar upp vissa aspekter av den totala verkligheten. Vilken del som tas upp beror bl a på våra intressen och syftet med utsagan. På dessa sätt förenklar vi verkligheten så att den blir överskådlig och möjlig att kommunicera. Ju mer vi förenklar den, desto mer generell blir den. Genom att göra den abstrakta utsagan mer generell kommer den att gälla allmänt och inte enbart för något speciellt fall vid något speciellt tillfälle. Detta gäller framför allt vetenskapliga lagar, som är generella lagar och gäller oberoende av det enskilda fallet.

Subject 1

Question 1

Texten påstod att alla utsagor om verkligheten är abstraktioner, eftersom man alltid utelämnar något. Detta gäller då speciellt vetenskapliga lagar. Ett exempel var om man nämner ordet bil, som inte säger något om färg, märke, årsmodell m m. utan egentligen bara syftar på en bil i största allmänhet.

Det läggs också in mycket personlig värdering i alla utsagor, vilket visades med exemplet på en fotbollsmatch. Om det är en far till en av spelarna som referera, kommer referatet troligen mest att handla om sonen. Om det är en utlänning som är här för att studera våra seder och bruk, kommer det att handla om hurrarop m m och om det är en societetsreporter, om spelarnas kläder och familjeförhållanden. Även om man sammanställde matchens alla åskådares reportage skulle det fortfarande fattas detaljer om matchen. När så vetenskapsmän beskriver hur de har fått möss att gå till höger i ett T, hoppar de över detaljer så att det även här blir abstrakta utsagor.

Question 2

Alla satser om verkligheten är abstrakta då vi inte beskriver exakta detaljer, utan det som är av personligt intresse för sändaren och mottagaren. Både sändaren och mottagaren lägger in känslor, önske- och viljevärderingar. Det är alltså enligt textens författare omöjligt att beskriva verkligheten exakt.

Subject 2

Question 1

Texten handlade om olika personers redogörelse för en och samma händelse. Varje person lämnade en redogörelse som var baserad på hans egna erfarenheter, intryck, ord- och språkval, allt som händer inom en viss tidsrymd kan inte skrivas ned i ord utan att det blir en förenklad version hur utförlig den än är.

Människan förenklar allt för att lättare kunna kommunicera med varandra. Använder generella ord även om man pratar om t ex en viss bil så säger man bara bil.

När en vetenskapsman söker sambandet mellan pendelns svängningstid och pendelns längd bryr han sig inte om vilket material pendeln är

gjord i, om den är ny eller gammal osv. Det enda han är intresserad av är längden och tiden för en svängningsperiod.

Question 2

Han ville säga att ord och meningar inte räcker till för att täcka allt vad som händer hur utförligt man än skriver eller berättar. Att människan förenklar och sammanfattar situationer enligt sin egen personlighet och egna smaker och intressen.

Subject 3

Question 1

Den handlar om utsagor som är abstrakta. Hur man än beskriver föremål så kan man inte få med alla detaljer. Beskriver man ordet bil så tänker man inte på de detaljer som märke, färg och t ex skick. Om någon ska referera en fotbollsmatch t ex så blir referatet helt olika, beroende på vem som har refererat den. Om det är en far till någon av spelarna eller t ex en utlänning. Även om en reporter samlar alla uppgifter om vad varje åhörare har sett, hört och upplevt och tar flera år i anspråk med att göra ett referat av matchen, finns där alltid detaljer som saknas.

Question 2

Hur noga man än beskriver ett föremål eller en situation, så finns där alltid uteblivna detaljer.

Subject 4

Question 1

Texten börjar med att presentera begreppet abstraktion, dvs vår förmåga att glömma och utelämnar detaljer när vi skriver. Ingen kan undgå abstraktion.

Vidare behandlades en fotbollsmatch sett ur olika personers synvinkel, att var och en beskrev matchen som den uppfattade den. Var och en lade också tonvikten på olika saker, alltefter ståndpunkt. Även om man frågade alla närvarande och samlade deras åsikter, skulle man i alla fall inte få med alla detaljer, eftersom det är omöjligt. Vid vetenskaplig forskning är det inte detaljerna som är viktiga, utan sammanhanget - slutsatsen. Detaljerna vid t ex ett experiment (i texten togs upp pendelns form och material, som inte spelar någon roll, då man ska beskriva pendelns rörelse) är oviktiga eftersom de inte rör sammanhanget och slutsatsen.

Question 2

Abstraktion är omöjlig att undvika och den drabbar alla människor utan avskiljning. Vid vetenskaplig forskning betyder inte abstraktion så mycket, eftersom man då ser till det stora hela och inte till detaljerna.